

- Lang, P., Ross, N., Krokowski, J. & Doughty, R. (2011). The elusive planktonic freshwater chrysophyte *Bitrichia longispina*: a first record for Scottish lochs and comparison with the commoner species, *Bitrichia chodatii*. *The Glasgow Naturalist* 25, 106 – 108.
- Lang, P., Krokowski, J. & Ross, N. (2012). The rare green alga *Pediastrum privum* (Chlorophyta, Sphaeropleales) in a Scottish kettle loch: new to British freshwaters. *The Glasgow Naturalist* 25, 139 – 142.
- Lang, P., Procházková, L., Krokowski, J., Meis, S., Spears, B.M., Milne, I. & Pottie, J. (2013). The bizarre Eustigmatacean alga, *Pseudostaurastrum limneticum* (Borge) Chodat, in a shallow, nutrient-enriched Scottish loch: new to the British Isles. *The Glasgow Naturalist* 25, (in press).
- Lewis, W.M. & Riehl, W. (1982). Phytoplankton composition and morphology in Lake Valencia, Venezuela. *International Review of Hydrobiology* 67, 297 – 322.
- Unrein, F., Gasol, J.M. & Massana, R. (2010). *Dinobryon fauliferum* (Chrysophyta) in coastal Mediterranean seawater: presence and grazing impact on bacteria. *Journal of Plankton Research* 32, 559 – 564.
- Willén, T. (1963). Notes on Swedish plankton algae. *Nova Hedwigia* 5, 39 – 56.
- Willén, T. (1992). *Dinobryon fauliferum*, a new name for *Dinobryon petiolatum* (Chrysophyceae: Dinobryaceae). *Taxon* 41, 62 – 63.

***Ollicola vangoorii* (Chrysophyceae, Chromulinales): an unfamiliar loricate protist newly documented in U.K. freshwaters from a southern upland loch, Scotland**

Pauline Lang & Jan Krokowski

Ecology Assessment Unit, Scottish Environment Protection Agency, Angus Smith Building, 6 Parklands Avenue, Eurocentral, Holytown, North Lanarkshire, ML1 4WQ, Scotland, U.K.

E-mail: pauline.lang@sepa.org.uk

Ollicola vangoorii (W. Conrad) Vørs [= *Calycomonas vangoorii* (W. Conrad) J.W.G. Lund] is a flagellate protist belonging to the chrysophyte ('golden') algae (Lang *et al.*, 2011), with a coastal temperate to polar distribution (Vørs, 1992). The protective envelope of this alga is characterized by transverse striations that produce the distinctly corrugated appearance of the species' vase-like lorica (Lund,

1960; Starmach, 1985) (Fig. 1a, b). Until now, *O. vangoorii* has not previously been recorded in U.K. freshwaters (G. Novarino & D. John, *pers. comm.*).

In the course of analysing phytoplankton samples collected as part of the Scottish Environment Protection Agency's ongoing assessment of the ecological status of freshwater lochs in Scotland (Lang *et al.*, 2013), small numbers (5 – 10 cells per 100 ml) of *O. vangoorii* were found in Loch Grannoch during the summer months of 2012. Loch Grannoch is situated in a largely afforested catchment of the southern uplands of Scotland (NGR: NX 54153 69674). It is an elongated lake with a surface area of c. 1.14 km², characterized by an acid-sensitive (annual mean -0.82 mg L⁻¹ as CaCO₃ in 2012) and slightly mesotrophic water chemistry [annual mean total phosphorus (TP) concentration 15.4 µg L⁻¹ in 2012].

Although *O. vangoorii* is typically known as a marine taxon (e.g., Novarino *et al.*, 2002), and is hence not currently featured in John *et al.* (2011), the species has also been documented from less saline Danish inland waters (G. Novarino, *pers. comm.*). Therefore, its occurrence in a freshwater environment is probably not unexpected, and furthermore suggests the species is adapted to a wide salinity range. This may well depend upon distinct eco-physiological variants. However, there seem to be no noticeable morphological differences in relation to salinity (G. Novarino, *pers. comm.*). Whether the *O. vangoorii* found to occur in freshwater is genetically similar to those inhabiting the marine environment, remains to be determined.

Besides the potential for a mixotrophic existence [i.e., capacity to derive energy from photosynthesis and by ingesting bacteria (Novarino *et al.*, 2002)], the ecological significance of *O. vangoorii* is poorly understood. Nonetheless, we present another interesting algal find that is completely new to the freshwaters of the British Isles.

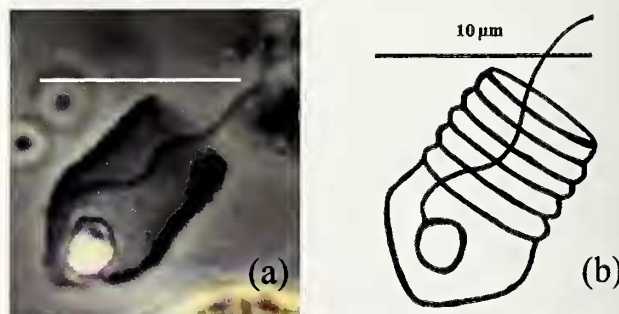


Fig. 1. *Ollicola vangoorii*. (a) Photomicrograph of *O. vangoorii* preserved in Lugol's iodine. Scalebar, 10 µm. (b) Line drawing of *O. vangoorii*.

ACKNOWLEDGEMENTS

Thanks especially to Dr Gianfranco Novarino and Professor David John (Natural History Museum, London) for formally verifying the identity of *O.*

vangoorii. We are grateful to Dr Elizabeth Haworth (Freshwater Biological Association) for confirming that no U.K. records of *O. vangoorii* pre-existed in the Fritsch Collection. We thank SEPA for providing the water chemistry data for Loch Grannoch. We also thank Dr Kevin Murphy (University of Glasgow) for proof-reading an earlier version of the manuscript.

REFERENCES

- John, D.M., Whitton, B.A. & Brook, A.J. (2011). *The Freshwater Algal Flora of the British Isles*, 2nd Edition. Cambridge University Press, Cambridge.
- Lang, P., Ross, N., Krokowski, J. & Doughty, R. (2011). The elusive planktonic freshwater chrysophyte *Bitrichia longispina*: a first record for Scottish lochs and comparison with the commoner species, *Bitrichia chodatii*. *The Glasgow Naturalist* 25, 106 – 108.
- Lang, P., Procházková, L., Krokowski, J., Meis, S., Spears, B.M., Milne, I. & Pottie, J. (2013). The bizarre Eustigmatacean alga, *Pseudostaurastrum limneticum* (Borge) Chodat, in a shallow, nutrient-enriched Scottish loch: new to the British Isles. *The Glasgow Naturalist* 25, (in press).
- Lund, J.W.G. (1960). Concerning *Calycomonas* Lohmann and *Codonomonas* Van Goor, *Nova Hedwigia* 1, 423 – 429.
- Novarino, G., Oliva, E. & Pérez-Uz, B. (2002). Nanoplankton protists from the western Mediterranean Sea. I. Occurrence, ultrastructure, taxonomy and ecological role of the mixotrophic flagellate *Ollicola vangoorii* (Chrysamonadidae = Chrysophyceae p.p.). *Scientia Marina* 66, 233 – 247.
- Starmach, K. (1985). Süßwasserflora von Mitteleuropa 1: Chrysophyceae und Haptophyceae, VEB Gustav Fisher Verlag, p. 108 – 109.
- Vørs, N. (1992). Heterotrophic amoebae, flagellates and heliozoa from the Tvärminne area, Gulf of Finland, *Ophelia* 36, 1 – 109.

Chlorococcalean, or green alga species, belonging to the genus *Desmatractum* West et G.S. West (1902) are solitary cells enclosed by a spindle-shaped 'fusiform' envelope, typically broader in the middle and tapering towards the poles (John & Tsarenko, 2011).

In the course of analysing phytoplankton samples collected as part of the Scottish Environment Protection Agency's ongoing assessment of the ecological status of freshwater lochs in Scotland (Lang *et al.*, 2013), *Desmatractum spryii* Nicholls was found to occur frequently (e.g., 10 – 20 cells per 100 ml sub-sample) in Loch Mochrum during the summer months of 2012. Loch Mochrum lies within the Machars Peninsula of Dumfries and Galloway, south-western Scotland (NGR: NX 30255 53183). The loch has an area of c. 0.9 km², is characterized by relatively low alkalinity (annual mean 6.57 mg L⁻¹ as CaCO₃ in 2012) and meso-eutrophic water chemistry [annual mean total phosphorus (TP) concentration 42.43 µg L⁻¹ in 2012].

Of the nine *Desmatractum* species recognized, only one of these, *D. bipyramidatum* (Chodat) Pascher is currently known to British freshwaters (Lund, 1942; John & Tsarenko, 2011). Hence, this finding of *D. spryii* in a Scottish peninsula loch comprises an entirely new record for the U.K. (D. John, *pers. comm.*).

Desmatractum spryii was originally described from the phytoplankton of several hardwater lakes in Ontario, Canada (Nicholls *et al.*, 1981), and has rarely been documented since, aside from Norway (Reymond & Skogstad, 1983), Germany and the Ukraine (Hegewald & Tsarenko, 1998). *Desmatractum spryii* (Fig. 1a, b) can be unmistakably differentiated from other members of the genus, by distinct ridges present in the equatorial region of the cell wall, a consistent characteristic of the species (Nicholls *et al.*, 1981; Reymond & Skogstad, 1983; Reymond & Kouwets, 1984).

Our observations, together with other published work, imply that *D. spryii* occupies a broad ecological niche of ranging alkalinity and nutrient conditions. Although we may presume that genetically these findings constitute the same species, for now, it seems the bio-indicator value of *D. spryii* remains undefined. Nonetheless this species encompasses a noteworthy discovery and a welcome addition to the British algal flora.

The fusiform green alga *Desmatractum spryii* (Chlorophyta, Chlorococcales): a noteworthy discovery made in a peninsula loch, S.W. Scotland

Pauline Lang & Jan Krokowski
Ecology Assessment Unit, Scottish Environment
Protection Agency, Angus Smith Building, 6
Parklands Avenue, Eurocentral, Holytown, North
Lanarkshire, ML1 4WQ, Scotland, UK

E-mail: pauline.lang@sepa.org.uk